From:
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To Whom It May Concern:

I am pleased to offer my support for the SciDAC Visualization and Analytics Center for Enabling Technology in their upcoming program review. I am writing as the Principal Investigator for M558, a simulation project of two million CPU-hours/year. This project supports experiments at the LOASIS program of LBNL, headed by Wim Leemans, which are developing high gradient laser wakefield particle accelerators to extend the reach of high energy physics and light sources. Simulations using the parallel VORPAL framework are used to interpret physics of the experiments (including the first narrow energy spread and first GeV beams) and to design next generation facilities such as the BELLA PetaWatt laser. The simulations generate multi-TB output that requires sophisticated visual analysis. Our team participates in the advanced accelerator component of the Community Petascale Project for Accelerator Science and Simulation (COMPASS), and received a 2006 INCITE award.

Through a productive collaborative effort with experimental, theoretical and computational physicists from LBNL and Tech-X Corp, the VACET Center has had a very positive impact on our laser wakefield simulations. Accomplishments include: developing a process for finding and tracking beam particles that requires seconds or minutes on our largest (multi-TB) simulation output instead of hours, and joint research and development of supervised and unsupervised machine learning techniques to help us quickly find and analyze beam particles in large simulation output. VACET has also provided us with production-quality, parallel visual analysis software (VisIt) that we use for exploration of simulation output too large for other tools as well as for creating high quality images. Several such images will appear in an upcoming issue of SciDAC Review. This work has resulted in joint publications in venues like the annual Supercomputing conference, the International Conference on Machine Learning Applications, and the SciDAC Review (submitted), and is now being integrated into our workflow and movie creation.

By allowing efficient analysis of large datasets, the VACET team has provided valuable support helping our team make progress towards petascale science, and is providing a valuable service to the scientific community.

Sincerely,

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